

FILE 'HCAPLUS' ENTERED AT 16:46:09 ON 24 AUG 2005

E US2003-0626336/PRN,AP
 L1 1 S (US2003-626336/PRN OR US2003-626336/AP)
 L2 SEL PLU=ON L1 1- RN : 6 TERMS
 L3 652595 S L2
 L4 1 S L1 AND L3
 D ALL HITSTR
 L5 SEL PLU=ON L4 1- NCL ECLA IC : 3 TERMS
 L6 13820 S OXIDIZING AGENTS/IT
 L7 363 S PEROXIDES, PROCESSES/IT
 L8 771 S VAPOR DEPOSITION PROCESSES(L) PHYSICAL
 S (7440-21-3/REG# OR SI OR SILICON OR SEMICOND##### OR METHO

FILE 'REGISTRY' ENTERED AT 16:50:17 ON 24 AUG 2005

L9 1 S 7440-21-3/RN

FILE 'HCAPLUS' ENTERED AT 16:50:17 ON 24 AUG 2005

L10 419116 S L9
 L11 754 S L5
 L12 754 S L5
 L13 754 S L5
 L14 975146 S (L10 OR SI OR SILICON OR SEMICOND#####
 OR METHOD OR L13) AND (AQ OR WATER OR H2O OR LIQUID)
 S (L10 OR SI OR SILICON OR SEMICOND##### OR METHOD OR L5) AND

FILE 'REGISTRY' ENTERED AT 17:00:09 ON 24 AUG 2005

L15 1 S 7722-84-1/RN

FILE 'HCAPLUS' ENTERED AT 17:00:10 ON 24 AUG 2005

L16 88896 S L15

FILE 'REGISTRY' ENTERED AT 17:00:10 ON 24 AUG 2005

L17 1 S 10028-15-6/RN

FILE 'HCAPLUS' ENTERED AT 17:00:10 ON 24 AUG 2005

L18 58224 S L17
 L19 754 S L5
 L20 76649 S (L10 OR SI OR SILICON OR SEMICOND#####
 OR METHOD OR L19) AND ((L6 OR L7) OR PEROXIDE OR H2O2 OR OZONE
 OR L18 OR OXIDIZER OR OXIDISER OR L16)
 L21 59438 S (PRECURSOR OR ORGANOMETAL##### OR
 METAL#####) (7A) (OXIDIS? OR OXIDIZ? OR OXIDED OR OXIDATE OR
 OXIDATED OR OXIDATING OR OXIDATION OR OXYGENAT#####)
 L22 165141 S (PRECURSOR OR ORGANOMETAL##### OR
 METAL#####) (7A) (AQ OR WATER OR H2O OR LIQUID)
 L23 3 S L14 AND L18 AND L19
 L24 4798 S L14 AND L18 AND L20
 L25 98 S L14 AND L18 AND L21
 L26 209 S L14 AND L18 AND L22
 L27 98 S L24 AND L25
 L28 209 S L24 AND L26
 L29 42 S L25 AND L26
 L30 42 S L27 AND L28 AND L29
 L31 45 S L23 OR L30
 L32 44 S L31 NOT L4
 L33 0 S DIRECTLY AND L32
 L34 19 S (METAL##### OR ORGANOMETAL? OR PRECURSOR) (5
 A) (SUBSTRATE OR PLATE OR SLAB OR DIE OR WAFER OR SEMICONDUCT###
 ##### OR SI OR SILICON) AND L32
 D ALL HITSTR TOT
 L35 20 S (LIQUID OR AQUEOUS OR SOLUTION) (4A) (OXID###
 ##### OR OXYGEN##### OR PEROXIDE OR H2O2) AND L32
 L36 10 S L35 NOT L34
 L37 13 S L32 AND (PRECURSOR OR ORGANOMETAL? OR
 ORGANO METAL##### OR ORGANIC##(2A)METAL#####)
 L38 2 S L37 NOT (L35 OR L34)

FILE 'HCAPLUS' ENTERED AT 17:00:10 ON 24 AUG 2005

L39 161 S OXID#####(5A)DIRECTLY(5A)SUBSTRATE
 L40 0 S L39 AND (L6 OR L7 OR L8)
 L41 43 S L39 AND L3
 L42 36 S L39 AND (L10 OR L11 OR L12 OR L13 OR L14)
 L43 14 S L39 AND (L16 OR (L18 OR L19 OR L20 OR L21
 OR L22 OR L23 OR L24 OR L25 OR L26 OR L27 OR L28 OR L29 OR L30
 OR L31 OR L32 OR L33 OR L34 OR L35 OR L36 OR L37))
 L44 54 S (L41 OR L42 OR L43) NOT (L38 OR L35 OR
 L34)
 L45 11 S L44 AND (LIQUID OR AQUEOUS OR SOLUTION OR
 WATER OR H2O)
 L46 5 S L44 AND PRECURSOR
 L47 13 S (L45 OR L46)
 D ALL HITSTR TOT
 L48 85 S (L41 OR L42 OR L43) OR L38 OR L35 OR L34
 L49 SEL PLU=ON L48 1- PRN : 75 TERMS

FILE 'WPIX, JAPIO, EPFULL, PCTFULL' ENTERED AT 17:12:03 ON 24 AUG 2005

L50 104 S L49
 L51 17 S L50 AND DIRECTLY
 L52 2 S L50 AND DIRECT(5A)(SUBSTRATE OR WAFER OR
 PLATE OR SILICON OR SI OR SEMICONDUCT#####)
 L53 19 S (L51 OR L52)
 D BIB AB KWIC 1-19
 L54 1316 S METAL#####(8A) PRECURSOR(8A) SUBSTRATE

FILE 'HCAPLUS' ENTERED AT 17:17:04 ON 24 AUG 2005

L55 SEL PLU=ON L4 1- IC : 1 TERM

FILE 'WPIX, JAPIO, EPFULL, PCTFULL' ENTERED AT 17:17:18 ON 24 AUG 2005

L56 976 S L55
 L57 7 S L56 AND L54
 L58 7 S L57 NOT L53
 D BIB AB KWIC 1-7

Rush

163706

SEARCH REQUEST FORM Scientific and Technical Information Center - EIC2800
Rev. 3/15/2004 This is an experimental format. Please give suggestions or comments to Jeff Harrison, JEF-4B68, 272-2511.

Date 8/24/05 Serial # 10/626,336 Priority Application Date 7/24/03
Your Name ORI NADAV Examiner # 75025
AU 2811 Phone 272-1660 Room 7A39
In what format would you like your results? Paper is the default. PAPER DISK EMAIL

If submitting more than one search, please prioritize in order of need.

The EIC searcher normally will contact you before beginning a prior art search. If you would like to alt with a searcher for an interactive search, please notify one of the searchers.

Where have you searched so far on this case?

Circle: USPT DWPI EPO Abs JPO Abs IBM TDB
Other: _____

What relevant art have you found so far? Please attach pertinent citations or Information Disclosure Statements. JP02001123293A

What types of references would you like? Please checkmark:

Primary Refs ☒ Nonpatent Literature _____ Other _____
Secondary Refs _____ Foreign Patents _____
Teaching Refs _____

What is the topic, such as the novelty, motivation, utility, or other specific facets defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, registry numbers, definitions, structures, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract and pertinent claims.

*metallic precursor directly on semiconductor substrate
and oxidizing the metallic precursor in a liquid, i.e.*

*metal oxidizing metal in liquid wherein the metal is
located directly on a semiconductor substrate*

Acting SPE: Steve Loh

Staff Use Only	Type of Search	Vendors
Searcher: <u>Harrison</u>	Structure (H) _____	STN <u>X</u>
Searcher Phone: <u>22511</u>	Bibliographic <u>X</u>	Dialog _____
Searcher Location: <u>STIC-EIC2800, JEF-4B68</u>	Litigation _____	Questel/Orbit _____
Date Searcher Picked Up: <u>8-24-05</u>	Fulltext _____	Lexis-Nexis _____
Date Completed: <u>8-25-05</u>	Patent Family _____	WWW/Internet _____
Searcher Prep/Rev Time: <u>83</u>	Other _____	Other _____
Online Time: <u>33</u>		

L34 ANSWER 11 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2001:611680 HCAPLUS

DN 135:188740

ED Entered STN: 23 Aug 2001

TI Liquid delivery MOCVD process for deposition of high frequency dielectric materials

IN Stauf, Gregory T.; Roeder, Jeffrey F.; Baum, Thomas H.

PA Advanced Technology Materials, Inc., USA

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6277436	B1	20010821	US 1998-216673	19981218
	US 5932905	A	19990803	US 1997-979684	19971126
	WO 2000037712	A1	20000629	WO 1999-US29566	19991213
PRAI	US 1997-979684	A2	19971126		
AB	US 1998-216673	A	19981218		

A liq. delivery MOCVD method for deposition of dielec. materials such as (Ba,Sr) titanates and (Zr,Sn) titanates, in which metal source compds. are dissolved or suspended in solvent and flash vaporized at temps. of from .apprx.100.degree. to .apprx.300.degree. and carried via a carrier gas such as Ar, N2, He, NH3 or the like, into a CVD reactor in which the precursor vapor is mixed with an oxidizing co-reactant gas such as O2, ozone, N2O, etc., to deposit the high dielec. metal oxide film on the substrate at a temp. of from .apprx.400.degree. to .apprx.1200.degree. at a CVD chamber pressure of from .apprx.0.1 torr to .apprx.760 torr. Such process may e.g. be employed to form a (Ba,Sr) titanate dielec. material in which .gtoreq.60 at of the total metal content of the oxide is Ti. The high dielec. material of the invention may be used to form capacitive microelectronic device structures for applications such as dynamic random access memories and high frequency capacitors.

IT Oxides (inorganic), processes
(liq. delivery MOCVD process for deposition of high frequency dielec. materials)

IT Vapor deposition process
(metalorg., liq. delivery; liq. delivery
MOCVD process for deposition of high frequency dielec. materials)

IT Transition metal complexes
RL: RCT (Reactant); RACT (Reactant or reagent)
(polyamine, vapor deposition precursor; liq.
delivery MOCVD process for deposition of high frequency dielec.
materials)

IT 7440-21-3, Silicon, processes
RL: PEP (Physical, engineering or chemical process); TEM (Technical or
engineered material use); PROC (Process); USES (Uses)
(liq. delivery MOCVD process for deposition of high frequency
dielec. materials)

RN 7440-21-3 HCAPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

IT 10028-15-6, Ozone, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(vapor deposition carrier gas; liq. delivery MOCVD process
for deposition of high frequency dielec. materials)

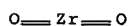
RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

L47 ANSWER 6 OF 13 HCAPLUS COPYRIGHT ACS on STN
AN 2002:776485 HCAPLUS
ED Entered STN: 11 Oct 2002
TI Aqueous chemical growth of 3-D arrays of metal oxide
nanomaterials
AU Vayssieres, Lionel
CS Department of Physics and Physical Chemistry, Uppsala University, SE-75121
Uppsala, Swed.
SO Abstracts of Papers, 224th ACS National Meeting, Boston, MA, United
States, August 18-22, 2002 (2002), PHYS-146 Publisher: American Chemical
Society, Washington, D. C.
CODEN: 69CZPZ
DT Conference; Meeting Abstract
LA English
AB Ordered purpose-built nanomaterials have been obtained by a novel
synthesis and theor. concept which consists of growing metal oxide
thin films directly onto substrates at pptn. and
dispersion conditions yielding to thermodyn. colloidal stability (i.e. low
interfacial tension). Such specific state is reached by controlling
exptl. (i.e. chem. and electrostatically) the interfacial tension of the
system as described quant. by a thermodyn. model based on Gibbs adsorption
equation. The outcome allows the fabrication of nano- to microparticulate
thin films of metal oxides with controlled particle size, morphol. and
nanoparticle orientation onto substrates without template or surfactant.
Cryst. 1D nanorods of iron oxides (hematite and akaganeite) assembled into
3D bundles with controlled parallel and perpendicular orientation, 3D
array of corundum chromium oxide-iron oxide nanocomposite, and highly
oriented 3D nanorod-array of ZnO have been obtained onto various (single
and polycryst.) substrates from the condensation of metal salts
in aq. soln. at low temp.

L47 ANSWER 3 OF 13 HCAPLUS COPYRIGHT ACS on STN
 AN 2004:217358 HCAPLUS
 DN 140:243895
 ED Entered STN: 18 Mar 2004
 TI Method and apparatus for plasma vapor deposition of metal oxide films or metal nitride films
 IN Sakamoto, Hitoshi; Ogura, Ken; Oba, Yoshiyuki; Nishimori, Toshihiko; Yahata, Naoki
 PA Mitsubishi Heavy Industries, Ltd., Japan
 PATENT NO. KIND DATE APPLICATION NO. DATE

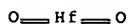
 PI JP 2004083945 A2 20040318 JP 2002-243240 20020823
 PRAI JP 2002-243240 20020823
 AB The metal oxide film is formed by a process including steps of (1) supplying halogen gas into a chamber and converting it to plasma which etches a metal member disposed at a position facing to a substrate so as to form a metal halide as a precursor of a metal film, (2) allowing to deposit a metal film while keeping the substrate temp. lower than that of the metal member, and (3) supplying oxygen gas (plasma) to oxidize the metal film into metal oxide film.
 In the process, halogen plasma and oxygen gas/plasma may be simultaneously supplied to form a metal film (on the substrate) is subjected to oxidn. or to directly form a metal oxide film. Alternatively, a metal halide is allowed to be adsorbed on the substrate in 2, then the halide is oxidized with oxygen gas plasma to give metal oxide film. Also claimed is formation of a metal nitride film in the same way, but by using nitrogen gas in stead of oxygen gas. The formed metal oxide or nitride film has high crystallinity and stable compns.
 IT 1314-23-4P, Zirconium oxide, preparation 1314-61-0P, Tantalum oxide 12055-23-1P, Hafnium oxide
 (films; plasma vapor deposition of metal oxide or metal nitride film by forming metal halide and subsequent oxidn. or nitridation)
 RN 1314-23-4 HCAPLUS
 CN Zirconium oxide (ZrO₂) (8CI, 9CI) (CA INDEX NAME)



RN 1314-61-0 HCAPLUS
 CN Tantalum oxide (Ta₂O₅) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 12055-23-1 HCAPLUS
 CN Hafnium oxide (HfO₂) (8CI, 9CI) (CA INDEX NAME)



L58 ANSWER 6 OF 7 WPIX COPYRIGHT THE THOMSON CORP on STN

AN 1992-398629 [48] WPIX

CR 1991-200636 [27]

DNN N1992-304110 DNC C1992-176815

TI Forming metal oxide coatings for range of substrate types - by coating substrate surface with polymer metal complex precursor soln. and firing to achieve specific properties in oxide coatings.

DC A82 L03 M13 P42 P73 U11 U12 X15

IN CHIEN, J C W; GONG, B

PA (SCSC-N) ACAD APPLIED SCI; (CHIE-I) CHIEN J C W; (GONG-I) GONG B

CYC 17

PI WO 9219391 A1 19921112 (199248)* EN 24
RW: AT BE CH DE DK ES FR GB GR IT LU MC NL SE
W: CA JP

US 5318800 A 19940607 (199422) 5

ADT WO 9219391 A1 WO 1992-US3505 19920428; US 5318800 A CIP of US 1989-407912 19890915, Cont of US 1991-693431 19910429, US 1992-997118 19921224

FDT US 5318800 A CIP of US 5024894

PRAI US 1991-693431 19910429

AB WO 9219391 A UPAB: 19940727

Thin, uniform, aberration-resistant and hole-free, high-temp. thermally stable metal oxide coatings are formed on a substrate by:- (1) forming a polymer-metal-complex precursor soln., (2) coating the precursor soln. after filtration uniformly over the substrate surface, (3) firing the coated substrate in an air or oxygen furnace to oxidise the metal in the coating while burning off all traces of the polymer and (4) cooling to provide a hard metal oxide coating of submicron or micron range thickness adhered to the substrate surface. Pref. the substrate can be either conducting, semiconducting or insulating.

USE/ADVANTAGE - The coating provides one or more of insulation, water surfacing, thermal barrier and rust or other oxidn. resistance for a metal substrate, or conductivity for an insulating substrate (all claimed). The coating method is both less complex and costly than prior art techniques such as e.g. sputtering or CVD.

Dwg.0/0

L58 ANSWER 2 OF 7 WPIX COPYRIGHT THE THOMSON CORP on STN
 AN 1996-455717 [45] WPIX
 CR 1990-238925 [31]; 1992-316377 [38]; 1993-214414 [26]; 1993-214416 [26];
 DNN N1996-383960 DNC C1996-142978
 TI Prodn. of a layered superlattice material for a ferroelectric device - by
 applying a thin layer of precursor soln. of polyoxyalkylated metals
 including strontium and bismuth and at least one other, to a substrate and
 baking.
 DC L03 U11 U14
 IN ITO, T; MCMILLAN, L D; PAZ DE ARAUJO, C A; SCOTT, M C; YOSHIMORI, H
 PA (OLYU) OLYMPUS CORP; (SYME-N) SYMETRIX CORP; (OLYU) OLYMPUS OPTICAL CO LTD
 CYC 20
 PI WO 9630938 A2 19961003 (199645)* EN 77
 RW: AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE
 W: JP KR
 WO 9630938 A3 19961205 (199712)
 EP 815589 A1 19980107 (199806) EN
 R: AT BE DE FR GB IE IT NL
 JP 11502375 W 19990223 (199918) 83
 KR 98702980 A 19980905 (199938)
 US 6072207 A 20000606 (200033) <--
 KR 433819 B 20040716 (200474)
 PRAI US 1995-405953 19950317; US 1991-660428 19910225;
 US 1991-807439 19911213; US 1992-965190 19921023;
 US 1992-981133 19921124; US 1993-65656 19930521
 AB WO 9630938 A UPAB: 20050512
 Wafer having a layered superlattice is formed by applying a liq.
 precursor of polyoxyalkylated metals to a
 substrate and heating. The metals include Sr and Bi and at least
 one of Ta, Nb, Ti and Zr. The precursor optimises an electrical property
 in the layered superlattice material.
 USE - As a ferroelectric device with a superlattice layer located
 between a pair of electrodes (claimed) for e.g. IC devices.
 ADVANTAGE - The material has extremely low fatigue rates and
 polarisabilities as high as 25.

L47 ANSWER 4 OF 13 HCAPLUS COPYRIGHT ACS on STN
AN 2003:673084 HCAPLUS
DN 139:371555
ED Entered STN: 28 Aug 2003
TI A novel Ge MOS detector for 1.3 μm and 1.5 μm lightwave
communication
AU Hsu, B.-C.; Hua, W.-C.; Shie, C.-R.; Lai, C.-C.; Chen, K.-F.; Yuan, F.;
Liu, C. W.
CS Department of Electrical Engineering, National Taiwan University, Taipei,
106, Taiwan
SO Proceedings - Electrochemical Society (2002), 2002-4(Integrated
Optoelectronics), 237-252
CODEN: PESODO; ISSN: 0161-6374
AB A novel, but simple metal-oxide-semiconductor detector using a
Ge active layer was successfully demonstrated. The oxide is
grown directly on Ge substrate by liq. phase
deposition with suitable growth conditions. At neg. gate bias, the dark
current of the photodetector is limited by the thermal generation of
minority carrier in the inversion layer. The max. external quantum
efficiency is estd. $\approx 50\%$. This novel Ge photodetector can be easily
integrated into Si substrate by growing a Ge epi-layer on
Si substrate.

L58 ANSWER 1 OF 7 WPIX COPYRIGHT THE THOMSON CORP on STN
AN 2003-505349 [47] WPIX
CR 1990-238925 [31]; 1992-316377 [38]; 1993-214414 [26]; 1993-214416 [26];
1994-167303 [20]; 1994-167763 [20]; 1994-167765 [20]; 1994-176138 [21];
DNN N2003-401292 DNC C2003-135159
TI Integrated circuit for semiconductor devices has layered superlattice
material having cerium, praseodymium, neodymium, promethium, samarium,
europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium,
ytterbium or lutetium.
DC L03 P73 U11
IN MCMILLAN, L D; PAZ DE ARAUJO, C A; SOLAYAPPAN, N; ARAUJO, C A P D
PA (SYME-N) SYMETRIX CORP
CYC 102
PI WO 2003049172 A1 20030612 (200347)* EN 53
US 2003152813 A1 20030814 (200355)
AU 2002333658 A1 20030617 (200419)
EP 1449241 A1 20040825 (200456) EN
US 2004211998 A1 20041028 (200471)
KR 2004071692 A 20040812 (200481) <--
JP 2005512323 W 20050428 (200530) 37
PRAI US 2001-998364 20011129; US 1992-965190 19921023;
US 1992-993380 19921218; US 1995-405885 19950317;
US 2000-686552 20001011; US 2004-851703 20040520
AB WO2003049172 A UPAB: 20050512
NOVELTY - An integrated circuit comprises a substrate (502), and a thin
film of layered superlattice material formed on the substrate. The thin
film comprises cerium, praseodymium, neodymium, promethium, samarium,
europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium,
ytterbium or lutetium.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:
(a) fabrication of memory device comprising forming a memory cell on
the substrate including spontaneously forming a layered superlattice
material structure in a thin film; and
(b) fabrication of ferroelectric layered superlattice material,
comprising: providing a substrate; providing a liquid
precursor including metals for forming a layered
superlattice material; applying the precursor liquid to the
substrate; and treating the precursor on the substrate to form a
layered superlattice material containing the metal on the first substrate.
USE - For semiconductor devices, e.g. MOSFET, ferroelectric FET,
heterojunction bipolar transistors, bismuth complementary MOS, infrared
sensitive cells, and capacitors.
ADVANTAGE - The invention has high dielectric constant materials
(524) that do not degrade or break down over long periods of use. It does
not only provide a ferroelectric memory that is more compatible with
conventional integrated circuit elements, but also provide one that is
more manufacturable and more environmentally compatible.
DESCRIPTION OF DRAWING(S) - The figure shows a cross-sectional view
of a dynamic RAM and a ferroelectric RAM memory cell having a FET and a
capacitor.
Memory 500
Substrate 502
High dielectric constant materials 524
Inter-level dielectric 536
Source electrode wiring 538
Top electrode wiring 539

L47 ANSWER 2 OF 13 HCAPLUS COPYRIGHT ACS on STN
AN 2004:348590 HCAPLUS
DN 142:268717
ED Entered STN: 29 Apr 2004
TI High efficient 820 nm MOS Ge quantum dot photodetectors for short-reach
integrated optical receivers with 1300 and 1550 nm sensitivity
AU Hsu, B.-C.; Chang, S. T.; Shie, C.-R.; Lai, C.-C.; Chen, P. S.; Liu, C. W.
CS Graduate Institute of Electronics Engineering and Department of Electrical
Engineering, National Taiwan University, Taipei, Taiwan
SO Technical Digest - International Electron Devices Meeting (2002) 91-94
CODEN: TDIMD5; ISSN: 0163-1918
PB Institute of Electrical and Electronics Engineers
DT Journal
LA English
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)
Section cross-reference(s): 48, 76
AB A metal-oxide-semiconductor (MOS) Ge quantum dot photodetector
is demonstrated. The oxide is grown directly on Ge
substrate by liq. phase deposition (LPD). The
photodetector has the responsivity of 130, 0.16, and 0.08 mA/W under the
wavelength of 820 nm, 1300 nm, and 1550 nm, resp. The dark current is
extremely low (0.06 mA/cm²). The high performance of Ge quantum dot MOS
photodetectors at 820 nm makes it feasible to integrate optoelectronic
devices into the Si chip for short-reach optical communication.
IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)
(fabrication and characterization of Ge quantum dot optical detectors
and receivers)
RN 7440-21-3 HCAPLUS
CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

High Efficient 820 nm MOS Ge Quantum Dot Photodetectors for Short-Reach Integrated Optical Receivers with 1300 and 1550 nm Sensitivity

B.-C. Hsu^a, S. T. Chang^a, C.-R. Shie^a, C.-C. Lai^a, P. S. Chen^b, and C. W. Liu^{a,b}

^a Graduate Institute of Electronics Engineering and Department of Electrical Engineering,
National Taiwan University, Taipei, Taiwan, R. O. C.

^b ERSO/ITRI, Hsinchu, Taiwan, R. O. C.

E-mail: chee@cc.ee.ntu.edu.tw

Abstract

A metal-oxide-semiconductor (MOS) Ge quantum dot photodetector is demonstrated. The oxide is grown directly on Ge substrate by liquid phase deposition (LPD). The photodetector has the responsivity of 130, 0.16, and 0.08 mA/W under the wavelength of 820 nm, 1300 nm, and 1550 nm, respectively. The dark current is extremely low (0.06 mA/cm²). The high performance of Ge quantum dot MOS photodetectors at 820 nm makes it feasible to integrate optoelectronic devices into the Si chip for short-reach optical communication.

Introduction

The interest of silicon-based optoelectronic devices grows rapidly in the last decade (1). However, due to the large absorption length ($\sim 16 \mu\text{m}$) of Si at 820 nm (2) and the forbidden absorption at 1300 and 1550 nm, the Si-based photodetector has limited detection efficiency and wavelength range. The incorporation of Ge into Si can not only increase the cut-off wavelength, but also enhance the absorption efficiency (small absorption length). The strained Ge could have an absorption length of $0.1 \mu\text{m}$ or less at the wavelength of 820 nm. In this paper, we use the metal-oxide-semiconductor (MOS) tunneling structure (3) with Ge quantum dot to implement the photodetector at 820 nm with high responsivity and extremely low dark current ($< 1 \text{ mA/cm}^2$). The low temperature ($\sim 50^\circ\text{C}$) liquid phase deposited (LPD) SiO₂ is used as gate dielectric material to avoid the high temperature thermal oxidation, which induces the Ge-related defects during oxidation. A 5-layer Ge quantum dots with $\sim 2 \text{ nm}$ wetting layers is used as a light absorbing layer, together with Si, Ge, and a Si_{0.8}Ge_{0.2} multi-layer structure for comparison.

Strained SiGe/Ge

Fig. 1 shows the bandgap and cut-off wavelength vs strained and relaxed Ge mole fraction. As Ge mole fraction increases, the maximum absorption wavelength also increases. The shadowed area represents the laser bandwidth in our experiment. Fig. 2 shows the absorption length at 820, 1300, and 1550 nm vs Ge mole fraction. The absorption length

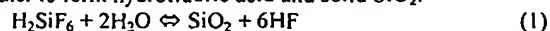
decreases as the Ge mole fraction increases. For the large Ge fraction, the shadowed areas indicate the uncertainty of the estimation. The incorporation of strained Ge/SiGe into optoelectronic devices makes devices particularly useful over the important fiber optic communications wavelengths, and can be applied to the fiber optic communications.

Ge Quantum Dots Fabrication

The Si/Ge quantum dots are prepared by UHVCVD (ultra high vacuum chemical vapor deposition) on p-type Si (001) substrates. The structure is shown in Fig. 5(a). After Si buffer layer of 50 nm was grown, 5 periods of Ge/Si bilayers were grown to form the self-assembled Ge dots at temperature of 600°C under the Stranski-Krastanov (SK) growth mode (4). The Ge layers are separated by 50 nm Si spacer layers. A 3 nm (nominal thickness) Si cap was deposited above the top layer of self-assembled Ge layer as the starting layer for the subsequent LPD oxide deposition. All UHVCVD layers are p-type with the estimated concentration on the order of $1 \times 10^{16} \text{ cm}^{-3}$. For comparison, RTO (Rapid Thermal Oxidation) was also performed. As a result, the LPD oxide yields larger external quantum efficiency than the rapid thermal oxide (Fig. 3).

Liquid Phase Deposition Oxide

To avoid material degradation such as strain relaxation and Ge out diffusion, the low temperature oxide is often required to reduce the thermal budget of SiGe device process. LPD is a promising low-temperature process for SiO₂ formation with the low thermal budget and low cost. A simplified mechanism of LPD growth was originally proposed by Nagayama et al. (5) based on the reaction of H₂SiF₆ with water to form hydrofluoric acid and solid SiO₂.



However, the time for solution preparation was too long in this LPD process. Therefore, we used the LPD method with short preparation time (6). The experimental flow diagram for the LPD process is illustrated in Fig. 4. First, the silicic acid (SiO₂·xH₂O) was added to hydrofluosilicic acid (H₂SiF₆, 3 mol/l) at the temperature of 35°C . The solution was then stirred for 3 hrs. Next, the solution was filtered to remove the undissolved silica. H₂O was then added to the saturated

4.3.1

solution. Si, Ge, Ge quantum dot, and $\text{Si}_{0.8}\text{Ge}_{0.2}$ multi-layer structure were used in this experiment. The native oxide was removed by dipping in diluted HF solution before the LPD process. The substrates were then placed into the immersing solution at 50°C. One interesting observation of LPD oxide on Ge quantum dot samples is that SiO_2 dots are formed directly on Ge dots, as shown in Fig. 5(b) and Fig. 6. The tensile strain field on the Si cap of self-assembled quantum dots can have preferential oxide deposition during LPD process. The oxide dots are formed on the tensile strained area of Si cap, and are aligned vertically with Ge dots embedded in the Si caps.

Photodetector

Fig. 7 shows the typical dark and photo current of a Ge quantum dot detector on p-type substrate. The fiber is pointed to the edge of the gate electrode and the photo-generated carriers can be collected by electrode by lateral drift and diffusion, as shown in the inset of Fig. 7. Note that the photocurrent is relatively independent of applied voltage, and the device can operate close to zero volt bias. Fig. 8 shows the band diagram of a Ge quantum dot NMOS detector under inversion bias. The deep depletion region is formed at inversion bias due to the tunneling of LPD oxide. The photoelectrons are generated in the deep depletion region, and are swept toward the gate electrode. The photoelectrons tunnel from the active layers to the Al gate electrode through the trap-assisted tunneling of LPD oxide. Since the band offset is mainly on the valence band, the electrons in the conduction band is less scattered by the conduction band discontinuity, as compared to holes in the valence band with large valence band discontinuity. The dark current of Si, Ge, Ge quantum dot, and $\text{Si}_{0.8}\text{Ge}_{0.2}$ multi-layer MOS devices are shown in Fig. 9. Note that the complex structure of valence band due to the wetting layer and quantum dots has little effects on our NMOS, where electron transport dominates. The dark current is mainly determined by thermal generation through the defects in the deep depletion region and the interface states. Thus, the Ge quantum dot device with a smaller bandgap has a larger dark current, as compared to the Si device.

Fig. 10, Fig. 11, and Fig. 12 are the responsivity and efficiency of devices under 820, 1300 and 1550 nm lightwave exposure, respectively. For 820 nm detection, the Ge quantum dot device has a very high external quantum efficiency (20%) similar to the Ge device. With the insertion of Ge quantum dots, the efficiency increases by a factor 10 as compared to the Si device. All the efficiency reported here is the external quantum efficiency. Due to the reflection of Si (~35 % at 820 nm) and the coupling loss, the internal quantum efficiency should reach 30%. This indicates extremely low defect density is formed during the UHV/CVD growth as well as the LPD process, and the defect-related recombination (if any) does not seriously degrade the efficiency. The dark current is as low as 0.06

mA/cm^2 for Ge quantum dot devices, while the dark current of typical Ge pin devices is $20 \text{ mA}/\text{cm}^2$ (7). For 1300 nm detection wavelength (Fig. 11), the responsivity of Ge quantum dot devices drops to $0.16 \text{ mA}/\text{W}$, due to the insufficient thickness of active layers, while Ge devices still have the responsivity of $100 \text{ mA}/\text{W}$. The responsivity of $\text{Si}_{0.8}\text{Ge}_{0.2}$ multi-layers is only $0.04 \text{ mA}/\text{W}$, due to the small Ge fraction in the films. For 1550nm detection (Fig. 12), the responsivity of the Ge quantum dot devices is $0.08 \text{ mA}/\text{W}$, while the responsivity of Ge devices is still around $75 \text{ mA}/\text{W}$. The quantum dot MOS detectors can also be operated at 850 nm (not shown here) with high responsivity ($> 300 \text{ mA}/\text{W}$). Note that the LPD oxide quality affects the device performance a lot. Therefore, to have best device performance, both the LPD process and the quantum dot structures should be optimized.

Conclusions

The MOS Ge quantum dot device can detect the wavelength of 820 nm, 1300 nm, and 1550 nm, with the responsivity of 130, 0.16, and $0.08 \text{ mA}/\text{W}$, respectively. The bias voltage can be as low as zero volt. The dark current is as low as $0.06 \text{ mA}/\text{cm}^2$. The detection efficiency of quantum dot device at 820 nm is close to the Ge device. The high performance of Ge quantum dot MOS detectors with LPD oxide at 820 nm makes it feasible to integrate optoelectronic devices into the Si chip for short-reach optical communication.

Acknowledgments

The authors would like to acknowledge Chun Liang Lin and Prof. Lon A. Wang of Optical Fiber Communication and Sensor Lab (OFC&S), Department of Electrical Engineering, National Taiwan University for the responsivity measurement of the Ge MOS detector. This work is partially supported by National Science Council, ROC, under contract nos. (91-2120-E-002-007, and 91-2215-E-002-027)

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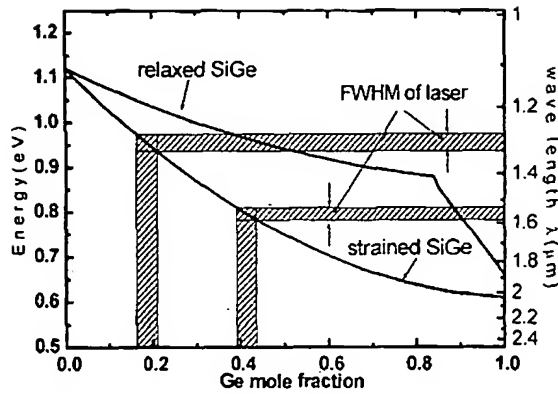


Fig. 1 The bandgap and cut-off wavelength vs Ge mole fraction. As Ge mole fraction increases, the maximum absorption wavelength also increases. The shadowed area represents the laser bandwidth in our experiment.

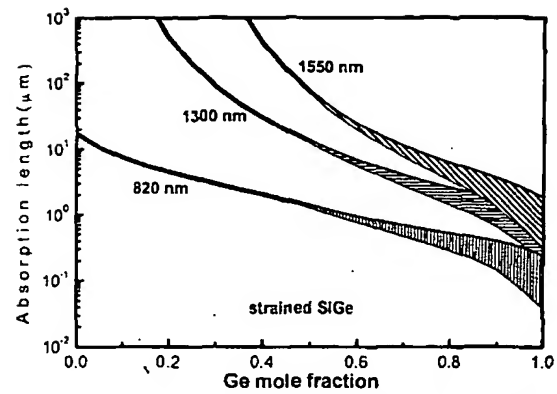


Fig. 2 The absorption length at 820, 1300, and 1550 nm vs Ge mole fraction. The absorption length decreases as the Ge mole fraction increases. For the large Ge fraction, the shadowed areas indicate the uncertainty of the estimation.

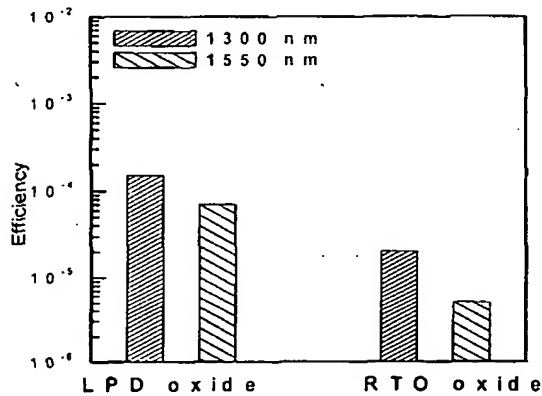


Fig. 3 The characteristics of Ge quantum dot detectors with RTO and LPD oxide. The MOS detector with RTO oxide has low efficiency.

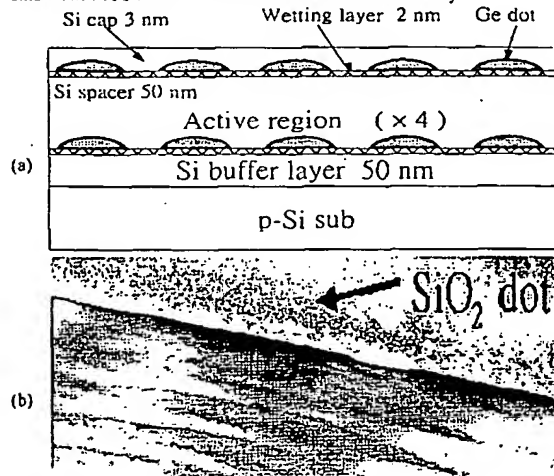


Fig. 5 (a) The structure of 5-layer Ge quantum dot devices prepared by UHV/CVD. Note that the top Ge quantum dots have a Si cap of 3 nm. (b) The TEM photograph.

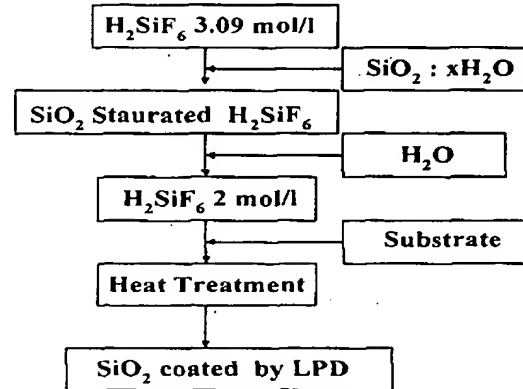


Fig. 4 The process flow of the liquid phase deposition.

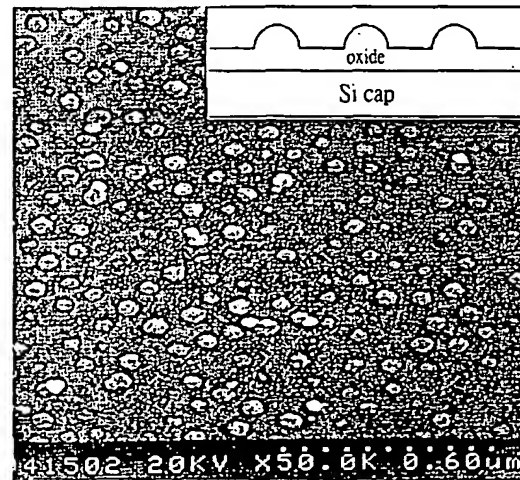


Fig. 6 The SEM morphology of quantum dot samples after the LPD process. The strain induced oxide dots are deposited directly on self-assembled Ge islands.

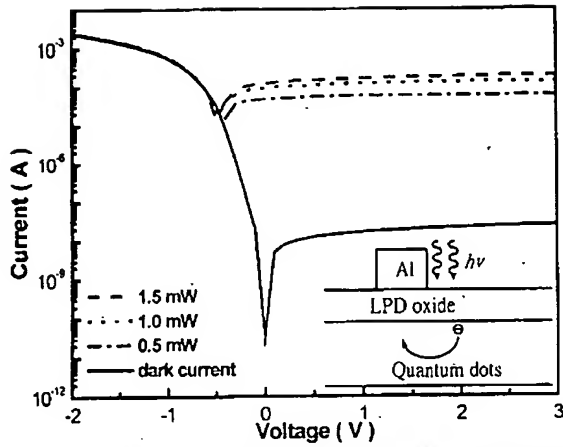


Fig. 7 The I-V characteristics of a quantum dot MOS detector under 820 nm lightwave exposure. The photo-generated carriers can be collected by gate electrode through the lateral drift and diffusion.

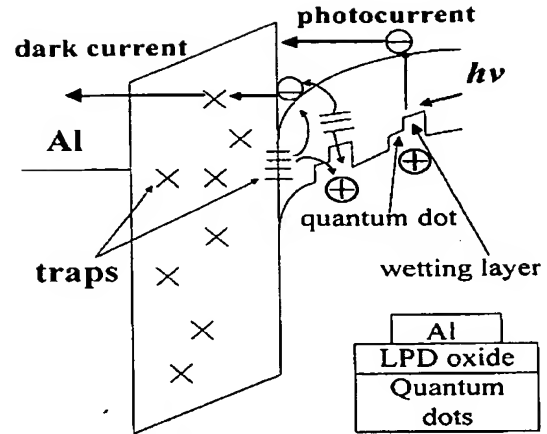


Fig. 8 The band diagram of a Ge quantum dot NMOS detector under inversion bias and the device structure. The photo-generated electrons tunnel through LPD oxide.

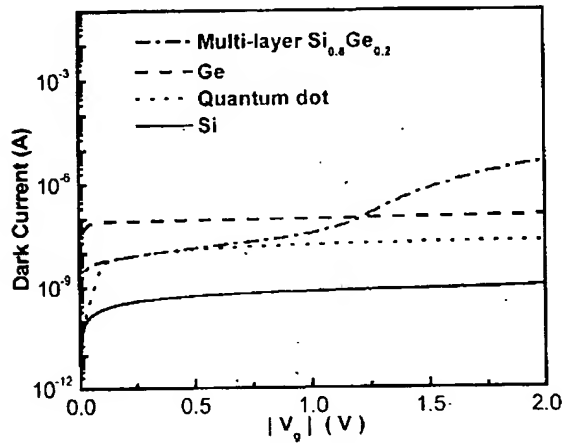


Fig. 9 The dark current of all 4 devices with LPD oxide.

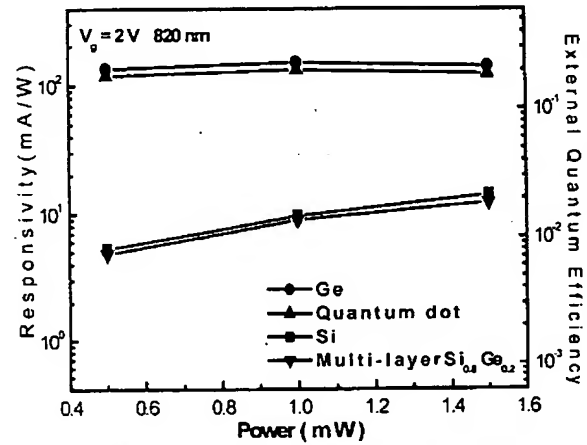


Fig. 10 The responsivity and efficiency at 820 nm. The Ge quantum dot device has a similar efficiency to Ge device.

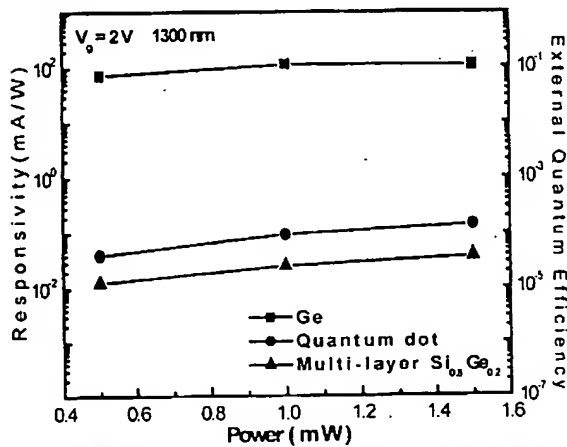


Fig.11 The responsivity and efficiency at 1300 nm. The efficiency of quantum dot detectors is larger than multi-layer $\text{Si}_{0.4}\text{Ge}_{0.2}$ detectors.

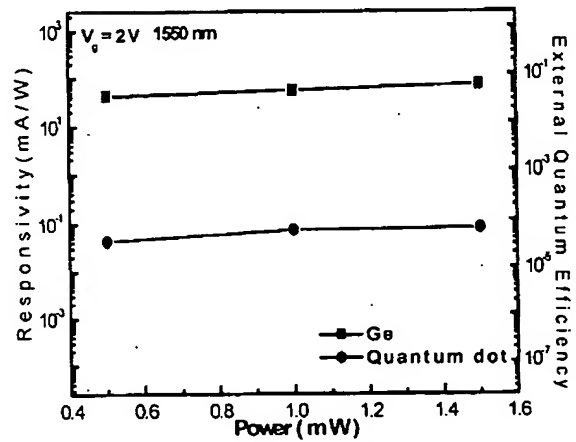


Fig.12 The responsivity and efficiency at 1550 nm. Only Ge and Ge quantum dot detectors have response at 1550 nm.

4.3.4

L34 ANSWER 5 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2004:802503 HCAPLUS

DN 141:323939

ED Entered STN: 01 Oct 2004

TI Method for forming a metal oxide film for capacitor

IN Koyanagi, Kenichi; Sakuma, Hiroshi

PA Japan

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004192036	A1	20040930	US 2004-808193	20040324
JP 2004296814	A2	20041021	JP 2003-87577	20030327
CN 1534741	A	20041006	CN 2004-10031392	20040326
DE 102004016162	A1	20041111	DE 2004-102004016162	20040326
JP 2003-87577	A	20030327		

PI

AB A method for forming a capacitor insulation film includes the step of depositing a monoat. film made of a metal by supplying a metal source including the metal and no O, and depositing a metal oxide film including the metal by using a CVD technique. The method provides the metal oxide film having higher film properties with a higher throughput.

IT 10028-15-6, Ozone, processes
 RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (CVD forming metal oxide film for capacitor)

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

O-O-O

IT 7440-21-3, Silicon, processes
 RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (CVD forming metal oxide film for capacitor on)

RN 7440-21-3 HCAPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

L34 ANSWER 1 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2005:219585 HCAPLUS

DN 142:289437

ED Entered STN: 11 Mar 2005

TI Methods of forming metal thin films, lanthanum oxide films, and
high dielectric films for semiconductor devices using atomic
layer deposition

IN Park, Ki-yeon; Kim, Sung-tae; Kim, Young-sun; Park, In-sung; Yeo,
Jae-hyun; Lee, Yun-jung; Im, Ki-vin

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
PI US 2005051828	A1	20050310	US 2004-828596	20040421
PRAI KR 2003-25533	A	20030422		

AB The present invention provides methods of forming metal thin
films, La oxide films and high dielec. films. Compns. of metal thin
films, La oxide films and high dielec. films are also provided. Further
provided are semiconductor devices comprising the metal
thin films, La oxide films and high dielec. films provided herein.

IT 10028-15-6, Ozone, processes

RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical,
engineering or chemical process); PROC (Process); USES (Uses)
(forming metal thin films, lanthanum oxide films, and high dielec.
films for semiconductor devices using at. layer deposition)

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

0_0_0

L53 ANSWER 8 OF 19 WPIX COPYRIGHT THE THOMSON CORP on STN

AN 1993-346486 [44] WPIX

DNN N1993-267615 DNC C1993-153382

TI Semiconductor circuitry structure mfr., e.g. capacitor MOS transistor, pixel, etc. - comprises growing buffer layer of high dielectric constant oxide layer contg. no lead or bismuth, directly or indirectly on semiconductor substrate etc..

DC L03 U11 U12 U14

IN SUMMERFELT, S R

PA (TEXI) TEXAS INSTR INC

CYC 7

PI EP 568064 A2 19931103 (199344)* EN 9

R: DE FR GB IT

JP 06224184 A 19940812 (199437) 7

TW 232748 A 19941021 (199501)

US 5393352 A 19950228 (199514) 7

EP 568064 A3 19940406 (199522)

US 5650646 A 19970722 (199735) 7

US 5912486 A 19990615 (199930)

EP 568064 B1 19990714 (199932) EN

R: DE FR GB IT

DE 69325614 E 19990819 (199939)

PRAI US 1992-876930 19920501; US 1993-127222

19930927; US 1995-395016 19950227; US

1997-842863 19970417

AB EP 568064 A UPAB: 19931213

Mfr. comprises (i) growing a buffer layer (26) of a non-Pb/Bi contg. high dielectric constant oxide layer directly or indirectly on a semiconductor substrate (10), and (ii) depositing a Pb/Bi-contg. high dielectric constant oxide (28) on to the buffer layer.

The substrates are pref. Si or GaAs. A layer of Ge (12) (or a metal) is pref. epitaxially grown directly or indirectly on the semiconductor substrate and the buffer layer is grown on the Ge layer. When the substrate is Si, the Ge layer is pref. less than 1 nm in thickness and the buffer layer is less than 10 nm thick. A 2nd non-Pb/Bi-contg. oxide layer (30) may be grown on top of layer (28), and a conducting layer (32) may be grown on top of layer (30). Both high dielectric constant oxides are pref. ferroelectric oxides and/or titanates. The non Pb/Bi-contg. oxide is BaSrTiO₃, the Pb/Bi-contg. oxide is lead zirconate titanate, and both layers may be epitaxially grown. Both oxides may be single crystals or the Ge layer may be grown on a non-single crystal SiO₂, Si₃N₄ or SiO₂/Si₃N₄ layer which is directly or indirectly grown on the semiconductor substrate.

USE/ADVANTAGE - Structures include capacitors, MOS transistors, pixels for light detecting arrays and those for electro-optic applications. The Ge buffer layer is effective and compatible with Si and many oxides. It allows ferroelectrics to be directly grown on to Si wafers to form non-volatile, non-destructive read out memory cells and increases the capacitance of large dielectric constant oxide films.

ABEQ US 5393352 UPAB: 19950412

The semiconductor structure is fabricated by (a) growing a Ge layer (in) directly on a semiconductor substrate, (b) growing a perovskite buffer layer of Pb and Bi free high dielectric constant oxide on.

L58 ANSWER 3 OF 7 WPIX COPYRIGHT THE THOMSON CORP on STN

AN 1995-256972 [34] WPIX

CR 1995-218447 [29]; 1995-256971 [34]; 2001-427784 [41]

DNN N1995-198254 DNC C1995-117259

TI Orienting thin film of ferroelectric material for electronic or light modulation device - comprises perovskite conductive thin film formed on single crystal substrate, ferroelectric material formed on above thin film.

DC L03 U11 U12 U14 V04 V07 X12

IN NASHIMOTO, K

PA (XERF) FUJI XEROX CO LTD

CYC 2

PI	JP 07133199	A	19950523 (199534)*	9
	US 5650362	A	19970722 (199735)	16
	US 5656382	A	19970812 (199738)	16<--
	JP 3199091	B2	20010813 (200148)	7

ADT JP 07133199 A JP 1993-297621 19931104; US 5650362 A Div ex US 1994-325583 19941019, US 1995-439371 19950511; US 5656382 A Cont of US 1994-325583 19941019, US 1996-620752 19960318; JP 3199091 B2 JP 1993-297621 19931104

FDT JP 3199091 B2 Previous Publ. JP 07133199

PRAI JP 1993-297621 19931104; JP 1993-297620 19931104;

JP 1993-297622 19931104

AB JP 07133199 A UPAB: 20010829

An epitaxial or orienting perovskite ABO₃ conductive thin film is formed on a single crystal substrate. An epitaxial or orienting ABO₃ thin film of a ferroelectric substance is formed on the above thin film. The substrate has an epitaxial or orienting buffer layer on its surface.

USE - The orienting thin film of the ferroelectric material is used for an electronic device, including a nonvolatile memory or a capacitor, or a light modulation device.

ADVANTAGE - Providing the epitaxial or orienting oxide electrode between the ferroelectric substance and the substrate produces light modulation device allowing low voltage driving, or a high performance switching device, including a nonvolatile memory. The epitaxial or orienting oxide electrode and the epitaxial or orienting thin film of the ferroelectric material are formed on the semiconductor substrate. The result produces the light modulation device on GaAs-based semiconductor laser, or a light integrated circuit on an Si semiconductor integrated circuit.

ABEQ. . . US 5650362UPAB: 19970828

A process for preparing a mono-axially oriented conductive thin film comprising coating a single crystal substrate with a metal oxide precursor solution comprising an unhydrolyzed organometallic compound and subjecting the coating layer to thermal decomposition followed by annealing the coated substrate. . .

ABEQ. . . structure oxide conductive thin film of BaPbO₃ oriented in only one direction which is obtained by coating a single crystal substrate with a solution of a metal oxide precursor comprising an un-hydrolysed organometallic compound, thermally decomposing the coating layer, and annealing the coated substrate.

L34 ANSWER 17 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2000:534917 HCAPLUS

DN 133:128678

ED Entered STN: 04 Aug 2000

TI Organometallic deposition of dielectric layers using supercritical fluids such as CO2 in semiconductor device fabrication

IN Morita, Kiyoyuki; Ohtsuka, Takashi; Ueda, Michihito

PA Matsushita Electric Industrial Co., Ltd., Japan

SO Eur. Pat. Appl., 32 pp.

CODEN: EPXXDW

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1024524	A2	20000802	EP 2000-101398	20000125
	CN 1264159	A	20000823	CN 2000-100676	20000127
	JP 2000357686	A2	20001226	JP 2000-18265	20000127
	TW 472295	B	20020111	TW 2000-89101390	20000127
	US 2002083959	A1	20020704	US 2000-492350	20000127
	US 6541278	B2	20030401		
	US 2003003604	A1	20030102	US 2002-230249	20020829
	US 6713316	B2	20040330		
	US 2003003770	A1	20030102	US 2002-230258	20020829
	US 6716663	B2	20040406		
PRAI	JP 1999-18597	A	19990127		
	JP 1999-104873	A	19990413		
	US 2000-492350	A1	20000127		

AB A semiconductor substrate is placed within a housing. By supplying organometallic complexes and CO2 in a supercrit. state into the housing, a BST thin film is formed on a Pt thin film, while at the same time, C compds., which are produced when the BST thin film is formed, are removed. The soly. of C compds. in the supercrit. CO2 is very high, and yet the viscosity of the supercrit. CO2 is low. Accordingly, the C compds. are removable efficiently from the BST thin film. An oxide or nitride film may also be formed by performing oxidn. or nitriding at a low temp. using H2O in a supercrit. or subcrit. state, for example.

IT 7722-84-1, Hydrogen peroxide, uses 10028-15-6, Ozone, uses

RL: NUU (Other use, unclassified); USES (Uses)

(oxidizing agent; organometallic deposition of

dielec. layers using supercrit. fluids such as carbon dioxide in semiconductor device fabrication)

RN 7722-84-1 HCAPLUS

CN Hydrogen peroxide (H2O2) (9CI) (CA INDEX NAME)

HO_OH

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

O_O_O

L36 ANSWER 5 OF 10 HCAPLUS COPYRIGHT ACS on STN

AN 2002:358781 HCAPLUS

DN 136:357461

ED Entered STN: 14 May 2002

TI Ozone-containing aqueous oxidizing
solution and manufacture of lithium-containing metal
oxide by using it for cathode active mass of secondary battery

IN Maruta, Junichi

PA Japan Storage Battery Co., Ltd., Japan

CODEN: JKXXAF

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002137923	A2	20020514	JP 2000-330737	20001030
JP 2000-330737		20001030		

AB The inversion relates to a method for manufg. Li-contg. metal
oxide by low-temp. synthesis using O3 as oxidant under pH control of
reaction soln. The oxidizing soln. contains alkali
metal chloride and O3. The method for manufg. Li-contg.
metal oxides involves a process for O3-oxidn. of
transition metal hydroxides contg. Ni, Co, Mn, and/or Fe in a
Li-ion-contg. soln. at pH 7.6-10.4. The oxidizing soln
. is stably in basic pH range for a long period, and the Li-contg. metal
oxide can be manufd. in high yield.

IT Battery cathodes

Oxidizing agents

(aq. oxidizing soln. contg. alkali

metal chloride and O3 for manuf. of Li-contg. metal oxide for
battery cathode active mass)

IT 10028-15-6, Ozone, uses

RL: NUU (Other use, unclassified); TEM (Technical or engineered material
use); USES (Uses)

(aq. oxidizing soln. contg. alkali

metal chloride and O3 for manuf. of Li-contg. metal oxide for
battery cathode active mass)

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

0-0-0

L34 ANSWER 10 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2002:522076 HCAPLUS

DN 137:81377

ED Entered STN: 12 Jul 2002

TI Method for depositing thin layers on a porous substrate, fuel cell and fuel cell comprising such a thin layer

IN Cassir, Michel; Bernay, Cecile; Lincot, Daniel; Goubin, Fabrice

PA Renault, Fr.

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002053798	A1	20020711	WO 2001-FR4102	20011220
	FR 2818993	A1	20020705	FR 2000-17225	20001228
	FR 2818993	B1	20031128		
	EP 1356133	A1	20031029	EP 2001-989640	20011220
PRAI	FR 2000-17225	A	20001228		
	WO 2001-FR4102	W	20011220		

AB The invention concerns a method for depositing on the surface of a porous substrate, thin layers of a solid ionic conductor comprising .gtoreq.1 base oxide and .gtoreq.1 doping agent. The deposition is carried out from precursor In of the metal ion of 1 of the base oxides, precursor II oxidizing the precursor In and, precursor III of 1 of the oxides inputting 1 of the doping agents; n and m are each an integer .gtoreq.1. The method involves providing .gtoreq.1 base oxide in a 1st sequence and .gtoreq.1 doping agent in a 2nd sequence. The 1st sequence is repeated 1-10 times, the 2nd sequence is repeated only once; the entire process constitutes a cycle. The deposition is produced for a (1st/2nd) sequence ratio detd. on the basis on the (doping agent(s)/basic oxide(s)) at. ratio and for a no. of cycles detd. on the basis of the thickness of the thin layer, and finally for a specific contacting duration between precursors and substrate. The invention also concerns a fuel cell, and a cell contg. such a thin layer.

IT 10028-15-6, Ozone, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(precursor in deposition of thin layers on porous substrate in manuf. of fuel cells)

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

L34 ANSWER 9 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2002:777943 HCAPLUS

DN 137:302573

ED Entered STN: 11 Oct 2002

TI Metalloamide and aminosilane precursors for CVD formation of dielectric thin films

IN Baum, Thomas H.; Xu, Chongying; Hendrix, Bryan C.; Roeder, Jeffrey F.

PA Advanced Technology Materials, Inc., USA

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002079211	A1	20021010	WO 2002-US9390	20020327
	US 2002175393	A1	20021128	US 2001-823196	20010330
	US 2002187644	A1	20021212	US 2001-954831	20010918
	US 6869638	B2	20050322		
	EP 1373278	A1	20040102	EP 2002-728580	20020327
	JP 2004529495	T2	20040924	JP 2002-577835	20020327
PRAI	US 2001-823196	A	20010330		
	US 2001-954831	A	20010918		
	WO 2002-US9390	W	20020327		

AB A CVD method of forming gate dielec. thin films on a substrate is described which uses metalloamide compds. of the formula $M(NR_1R_2)_p$, or [I where M is Zr, Hf, Y, La, lanthanide series elements, Ta, Ti, or Al; N is nitrogen; each of R_1 and R_2 is same or different and is independently selected from H, aryl, perfluoraryl, C1-C8 alkyl, C1-C8 perfluoroalkyl, alkylsilyl; and x is the oxidn. state on metal M;] and an aminosilane compd. of the formula $H_pSiA_q(NR_1R_2)_4-p-q$, or [II where H is hydrogen; p is 0-3; Si is Si; A is a halogen; q is 0-3; N is nitrogen; each of R_1 and R_2 is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl, C1-C8 alkyl, and C1-C8 perfluoroalkyl; and n is from 1-6.]. By comparison with the std. SiO_2 gate dielec. materials, these gate dielec. materials provide low levels of C and halide impurity.

IT 10028-15-6, Ozone, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(oxidizing gas; metalloamide and aminosilane precursors for CVD formation of dielec. thin films)

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

L34 ANSWER 8 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2002:975882 HCAPLUS

DN 138:48438

ED Entered STN: 27 Dec 2002

TI Atomic-layer deposition of metal oxide using organometallic complex having .beta.-diketone

IN Lee, Jung Hyun; Kim, Dae Sik; Min, Joseph; Cho, Young Jin

PA Samsung Electronics Co., Ltd., S. Korea

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002371359	A2	20021226	JP 2002-79875	20020322
	KR 2002095342	A	20021226	KR 2001-33532	20010614
	US 2003008072	A1	20030109	US 2002-160111	20020604
	US 6752869	B2	20040622		
PRAI	KR 2001-33532	A	20010614		

AB The title method involves letting the organometallic complex chemisorb on a substrate and oxidizing by activated O radicals.

IT 10028-15-6, Ozone, uses

RL: NUU (Other use, unclassified); USES (Uses)

(at.-layer deposition of metal oxide by radical oxidn
 . of chemisorbed organometallic complex having
 .beta.-diketone)

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

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not semiconductor?